5-04 HOT MIX ASPHALT

5-04.1 Description

This Work shall consist of providing and placing 1 or more layers of plant-mixed hot mix asphalt (HMA) on a prepared foundation or base in accordance with these Specifications and the lines, grades, thicknesses, and typical cross-sections shown in the Plans.

HMA shall be composed of asphalt binder and mineral materials as may be required, mixed in the proportions specified to provide a homogeneous, stable, and workable mixture.

5-04.2 Materials

Materials shall meet the requirements of the following sections:

Asphalt Binder	9-02.1(4)
Cationic Emulsified Asphalt	9-02.1(6)
Anti-Stripping Additive	9-02.4
Aggregates	9-03.8
Blending Sand	9-03.8(4)
Mineral Filler	9-03.8(5)
Recycled Material	9-03.21

The Contract documents may establish that the various mineral materials required for the manufacture of HMA will be furnished in whole or in part by the Contracting Agency. If the documents do not establish the furnishing of any of these mineral materials by the Contracting Agency, the Contractor shall be required to furnish such materials in the amounts required for the designated mix. Mineral materials include coarse and fine aggregates, blending sand, and mineral filler.

The Contractor may choose to utilize recycled asphalt pavement (RAP) in the production of HMA. If utilized, the amount of RAP shall not exceed 20-percent of the total weight of aggregate in the mix. The RAP may be from pavements removed under the Contract, if any, or pavement material from an existing stockpile.

The grade of asphalt binder shall be as required by the Contract. Prior to the submittal of the mix design, the Contractor shall provide a written designation of the grade of PG asphalt binder to be used. The Contractor may propose the substitution of alternate grades of performance grade (PG) asphalt binder at no cost to the Contracting Agency. The proposal will be approved if the proposed alternate asphalt binder has an average 7-day maximum pavement design temperature that is equal to or higher than the specified asphalt binder and has a minimum pavement design temperature that is equal to or lower than the specified asphalt binder. The substituted alternate grade of asphalt binder shall be used in all HMA Contract items of the same class and originally specified grade of asphalt binder. Blending of asphalt binder from different sources is not permitted.

When the Contracting Agency provides aggregates or provides a source for the production of aggregates, the Contract Provisions will establish the approximate percentage of asphalt binder required in the mixture for each class of pavement.

Production of aggregates shall comply with the requirements of Section 3-01.

Preparation of stockpile site, the stockpiling of aggregates, and the removal of aggregates from stockpiles shall comply with the requirements of Section 3-02.

5-04.3 Construction Requirements

5-04.3(1) HMA Mixing Plant

Plants used for the preparation of HMA shall conform to the following requirements:

1. **Equipment for Preparation of Asphalt Binder.** Tanks for the storage of asphalt binder shall be equipped to heat and hold the material at the required temperatures. The heating shall be accomplished by steam coils, electricity, or other approved means so that no flame shall be in contact with the storage tank. The circulating system for the asphalt binder shall be designed to ensure proper and continuous circulation during the operating period. A valve for the purpose of sampling the asphalt binder shall be placed in either the storage tank or in the supply line to the mixer.
2. **Thermometric Equipment.** An armored thermometer, capable of detecting temperature ranges expected in the HMA mix, shall be fixed in the asphalt binder feed line at a location near the charging valve at the mixer unit. The thermometer location shall be convenient and safe for access by Inspectors.

   The plant shall also be equipped with an approved dial-scale thermometer, a mercury actuated thermometer, an electric pyrometer, or another approved thermometric instrument placed at the discharge chute of the drier to automatically register or indicate the temperature of the heated aggregates. This device shall be in full view of the plant operator.
3. **Sampling and Testing of Mineral Materials.** The HMA plant shall be equipped with a mechanical sampler for the sampling of the mineral materials. The mechanical sampler shall meet the requirements of Section 1-05.6 for the crushing and screening operation.

   The Contractor shall provide sufficient space as required for the setup and operation of the field testing facilities of the Contracting Agency.
4. **Sampling HMA.** The HMA plant shall provide for sampling HMA by one of the following methods:
   a. A mechanical sampling device attached to the HMA plant.
   b. Platforms or devices to enable sampling from the hauling vehicle without entering the hauling vehicle.

5-04.3(2) Hauling Equipment

Trucks used for hauling HMA shall have tight, clean, smooth metal beds and shall have a cover of canvas or other suitable material of sufficient size to protect the mixture from adverse weather. Whenever the weather conditions during the workshift include, or are forecast to include, precipitation or an air temperature less than 45°F, the cover shall be securely attached to protect the HMA.

In order to prevent the HMA mixture from adhering to the hauling equipment, truck beds are to be sprayed with an environmentally benign release agent. Excess release agent shall be drained prior to filling hauling equipment with HMA. Petroleum derivatives or other coating material that contaminate or alter the characteristics of the HMA shall not be used. For hopper trucks, the conveyer shall be in operation during the process of applying the release agent.

5-04.3(3) Hot Mix Asphalt Pavers

HMA pavers shall be self-contained, power-propelled units, provided with an internally heated vibratory screed and shall be capable of spreading and finishing courses of HMA plant mix material in lane widths required by the paving section shown in the Plans.

The screed shall be operated in accordance with the manufacturer's recommendations and shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, segregating, or gouging the mixture. A copy of the manufacturer's recommendations shall be provided upon request by the Contracting Agency. Extensions will be allowed provided they produce the same results, including ride, density, and surface texture as obtained by the primary screed. Extensions without augers and an internally heated vibratory screed shall not be used in the Traveled Way.

When laying HMA, the paver shall be operated at a uniform forward speed consistent with the plant production rate and roller train capacity to result in a continuous operation. The auger speed and flight gate opening shall be adjusted to coordinate with the operation.

The paver shall be equipped with automatic screed controls with sensors for either or both sides of the paver. The controls shall be capable of sensing grade from an outside reference line, sensing the transverse slope of the screed, and providing automatic signals that operate the screed to maintain the desired grade and transverse slope. The sensor shall be constructed so it will operate from a reference line or a mat referencing device.

The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1-percent. The paver shall be equipped with automatic feeder controls, properly adjusted to maintain a uniform depth of material ahead of the screed.

Manual operation of the screed will be permitted in the construction of irregularly shaped and minor areas. These areas include, but are not limited to, gore areas, road approaches, tapers and left-turn channelizations.

When specified in the Contract, reference lines for vertical control will be required. Lines shall be placed on both outer edges of the Traveled Way of each Roadway. Horizontal control utilizing the reference line will be permitted. The grade and slope for intermediate lanes shall be controlled automatically from reference lines or by means of a mat referencing device and a slope control device. When the finish of the grade prepared for paving is superior to the established tolerances and when, in the opinion of the Engineer, further improvement to the line, grade, cross-section, and smoothness can best be achieved without the use of the reference line, a mat referencing device may be substituted for the reference line. Substitution of the device will be subject to the continued approval of the Engineer. A joint matcher may be used subject to the approval of the Engineer. The reference line may be removed after the completion of the first course of HMA when approved by the Engineer. Whenever the Engineer determines that any of these methods are failing to provide the necessary vertical control, the reference lines will be reinstalled by the Contractor.

The Contractor shall furnish and install all pins, brackets, tensioning devices, wire, and accessories necessary for satisfactory operation of the automatic control equipment.

If the paving machine in use is not providing the required finish, the Project Engineer may suspend Work as allowed by Section 1-08.6. Any cleaning or solvent type liquids spilled on the pavement shall be thoroughly removed before paving proceeds.

5-04.3(4) Rollers

Rollers shall be of the steel wheel, vibratory, or pneumatic tire type, in good condition and capable of reversing without backlash. Operation of the roller shall be in accordance with the manufacturer's recommendations. When ordered by the Project Engineer for any roller planned for use on the project, the Contractor shall provide a copy of the manufacturer's recommendation for the use of that roller for compaction of HMA. The number and weight of rollers shall be sufficient to compact the mixture in compliance with the requirements of Section 5-04.3(10). The use of equipment that results in crushing of the aggregate will not be permitted. Rollers producing pickup, washboard, uneven compaction of the surface, displacement of the mixture or other undesirable results shall not be used.

5-04.3(5) Conditioning of Existing Surface

When the surface of the existing pavement or old base is irregular, the Contractor shall bring it to a uniform grade and cross-section as shown on the Plans or approved by the Engineer.

Preleveling of uneven or broken surfaces over which HMA is to be placed may be accomplished by using an asphalt paver, a motor patrol grader, or by hand raking, as approved by the Engineer.

5-04.3(5)A Preparation of Existing Surfaces

Before construction of HMA on an existing paved surface, the entire surface of the pavement shall be clean. All fatty asphalt patches, grease drippings, and other objectionable matter shall be entirely removed from the existing pavement. All pavements or bituminous surfaces shall be thoroughly cleaned of dust, soil, pavement grindings, and other foreign matter. All holes and small depressions shall be filled with an appropriate class of HMA. The surface of the patched area shall be leveled and compacted thoroughly.

A tack coat of asphalt shall be applied to all paved surfaces on which any course of HMA is to be placed or abutted. Tack coat shall be uniformly applied to cover the existing pavement with a thin film of residual asphalt free of streaks and bare spots. A heavy application of tack coat will be applied to all joints. For Roadways open to traffic, the application of tack coat shall be limited to surfaces that will be paved during the same working shift. The spreading equipment shall be equipped with a thermometer to indicate the temperature of the tack coat material.

Equipment shall not operate on tacked surfaces until the tack has broken and cured. If the Contractor's operation damages the tack coat it shall be repaired prior to placement of the HMA.

Unless otherwise approved by the Engineer, the tack coat shall be CSS-1, CSS-1h, or STE-1 emulsified asphalt. The CSS-1 and CSS-1h emulsified asphalt may be diluted with water at a rate not to exceed 1-part water to 1-part emulsified asphalt. The tack coat shall not exceed the maximum temperature recommended by the emulsified asphalt manufacturer.

5-04.3(5)B Preparation of Untreated Roadway

When designated in the Plans the existing Roadway shall be prepared and primed. The Roadway preparation shall be performed in accordance with the Bituminous Surface Treatment provisions for this type of Work (Section 5-02.3(2)A), except that only one

application of asphalt and one application of aggregate shall be applied. The aggregate shall conform either to the requirements of Section 9-03.4, 9-03.8 or shall consist of other material approved by the Engineer. All other provisions of Section 5-02 pertaining to New Construction bituminous surface treatments shall apply to this preparation Work, except as hereinafter modified.

The prime coat shall be applied over the full length of the project. HMA shall not be placed until the prime coat has cured for 5-days unless otherwise approved by the Engineer.

Should any holes, breaks, or irregularities develop in the Roadway surface after the prime coat has been applied, they shall be patched, as described in Section 5-04.3(5)A, before placement of the HMA pavement. The Contractor shall maintain the completed prime coat by blading or brooming with equipment and procedures approved by the Engineer, until the HMA pavement is placed.

After the maintenance, patching or repair Work has been completed and immediately prior to placing the HMA, the surface of the prime coat shall be swept clean of all dirt, dust, or other foreign matter.

When the prime coat application is not specified in the Special Provisions or shown in the Plans, the Contractor shall prepare the untreated Roadway as described above and shall omit the prime coat treatment. The HMA shall be constructed on the prepared Subgrade.

The Contractor shall prepare untreated Shoulders and traffic islands by blading and compacting to provide a sound base for paving and shall omit the prime coat treatment. The HMA shall be constructed on the prepared Subgrade.

5-04.3(5)C Crack Sealing

When the Proposal includes a pay item for crack sealing, all cracks and joints ¼-inch and greater in width shall be cleaned with a stiff-bristled broom and compressed air and then shall be filled completely with sand slurry.

The sand slurry shall consist of approximately 20-percent CSS-1 emulsified asphalt, approximately 2-percent Portland cement, water (if required), and the remainder clean U.S. No. 4-0 paving sand. The components shall be thoroughly mixed and then poured into the cracks and joints until full. The following day, any cracks or joints that are not completely filled shall be topped off with additional sand slurry. After the sand slurry is placed, the filler shall be struck off flush with the existing pavement surface and allowed to cure. The HMA overlay shall not be placed until the slurry has fully cured. The requirements of Section 1-06 will not apply to the Portland cement and paving sand used in the sand slurry.

5-04.3(5)D Soil Residual Herbicide

Where shown in the Plans, the Contractor shall apply one application of an approved soil residual herbicide. The requirements of Section 8-02.3(2)A shall apply to this application. Paving shall begin within 24-hours after application of the herbicide.

The material to be used shall be registered with the Washington State Department of Agriculture for use under pavement. Before use, the Contractor shall obtain approval of the material to be used and the proposed rate of application from the Project Engineer. The following information shall be included in the request for approval of the material:

1. Brand Name of the Material;
2. Manufacturer;
3. Environmental Protection Agency (EPA) Registration Number;
4. Material Safety Data Sheet; and
5. Proposed Rate of Application.

5-04.3(5)E Pavement Repair

The Contractor shall excavate pavement repair areas and shall backfill these with HMA in accordance with the details shown in the Plans and as staked.

The Project Engineer will determine the excavation depth, which may vary up to 1-foot. The determination will depend on the location of material suitable for support of the pavement.

The minimum width of any pavement repair area shall be 3-feet unless shown otherwise in the Plans. Before any excavation, the existing pavement shall be sawcut or shall be removed by a pavement grinder.

Asphalt for tack coat shall be required as specified in Section 5-04.3(5)A. A heavy application of tack coat shall be applied to all surfaces of existing pavement in the pavement repair area.

The Contractor shall excavate only within one lane at a time unless approved otherwise by the Project Engineer. Any repair areas started during a workshift shall be completed during the same workshift. The Contractor shall not excavate more area than can be completely finished during the same shift.

Excavated materials will become the property of the Contractor and shall be disposed in a Contractor-provided site off the Right of Way or used in accordance with Sections 2-02.3(3) or 9-03.21.

The Contractor shall conduct the excavation operations in a manner that will protect the pavement that is to remain. Pavement not designated to be removed that is damaged as a result of the Contractor's operations shall be repaired by the Contractor to the satisfaction of the Project Engineer at no cost to the Contracting Agency.

Placement of the HMA backfill shall be accomplished in lifts not to exceed 0.35-foot compacted depth. Each lift shall be thoroughly compacted by a mechanical tamper or a roller.

5-04.3(6) Heating of Asphalt Binder

The temperature of the asphalt binder shall not exceed the maximum recommended by the asphalt binder manufacturer. The asphalt binder shall be heated in a manner that will avoid local variations in heating. The heating method shall provide a continuous supply of asphalt binder to the mixer at a uniform average temperature with no individual variations exceeding 25°F.

5-04.3(7) Preparation of Aggregates

The aggregates shall be stockpiled according to the requirements of Section 3-02. Sufficient storage space shall be provided for each size of aggregate. The aggregates shall be removed from stockpile(s) in a manner to ensure a minimum of segregation when being moved to the HMA plant for processing into the final mixture. Different aggregate sizes shall be kept separated until they have been delivered to the HMA plant.

5-04.3(7)A Mix Design

1. **General.** Prior to the production of HMA, the Contractor shall determine a design aggregate structure and asphalt binder content in accordance with WSDOT Standard Operating Procedure 732. Once the design aggregate structure and asphalt binder content have been determined, the Contractor shall submit the HMA mix design on DOT form 350-042 demonstrating that the design meets the requirements of Sections 9-03.8(2) and 9-03.8(6). For HMA accepted by commercial evaluation only the first page of DOT form 350-042 and the percent of asphalt binder is required. In no case shall the paving begin before the determination of anti-strip requirements has been made.

   Changes to the aggregate or asphalt binder require approval of the Engineer and may require a new mix design submittal from the Contractor. For aggregate this will include changes in the source of material or a change in the percentage of material from a stockpile greater than 5 precent. Asphalt binder changes include the source of the crude petroleum supplied to the refinery, the refining process and additives or modifiers in the asphalt binder. For mix designs that will be used in more than one calendar year and have not changed the Contractor shall submit a certification that the mix design has not changed.

2. **Statistical or Nonstatistical Evaluation.** When the Contract calls for either of these evaluation methods, the Contractor shall submit representative samples of the mineral materials that are to be used in the HMA production. The Contracting Agency will use these samples to determine anti-strip requirements, if any, in accordance with WSDOT test method T 718 and will also conduct verification testing of the mix design. Verification testing of HMA mix designs proposed by the Contractor that include RAP will be completed without the inclusion of the RAP. Submittal of RAP samples is not required. A mix design verification report will be provided within 25-calendar days after a mix design submittal has been received in the State Materials Laboratory in Tumwater.

   If the results of the verification testing of the mix design by the Contracting Agency are within the tolerances in Section 9-03.8(7) the mix design will be considered verified. HMA requiring nonstatistical evaluation must have a verified mix design before paving will be allowed. Where HMA requires statistical evaluation, and where the mix design did not meet the required tolerances to be verified, the Contractor shall have the option to either resubmit a new mix design or proceed to paving the HMA mixture test section.

   The mix design will be the initial job mix formula (JMF) for the class of mix. Any additional adjustments to the JMF will require the approval of the Project Engineer and may be made per Section 9-03.8(7).

3. **Commercial Evaluation.** Verification of the mix design by the Contracting Agency is not required. The Project Engineer will determine anti-strip requirements for the HMA. For commercial HMA, the Contractor shall select a class of HMA and design level of Equivalent Single Axle Loads (ESAL's) appropriate for the required use.

5-04.3(8) Mixing

After the required amounts of mineral materials and asphalt binder have been introduced into the mixer the HMA shall be mixed until a complete and uniform coating of the particles and a thorough distribution of the asphalt binder throughout the mineral materials is ensured.

When discharged, the temperature of the HMA shall not exceed the maximum temperature recommended by the asphalt binder manufacturer. A maximum water content of 2-percent in the mix, at discharge, will be allowed providing the water causes no problems with handling, stripping, or flushing. If the water in the HMA causes any of these problems, the moisture content shall be reduced as directed by the Project Engineer.

Storing or holding of the HMA in approved storage facilities will be permitted during the daily operation but in no event shall the HMA be held for more than 24-hours. HMA held for more than 24-hours after mixing shall be rejected. Rejected HMA shall be disposed of by the Contractor at no expense to the Contracting Agency. The storage facility shall have an accessible device located at the top of the cone or about the third point. The device shall indicate the amount of material in storage. No HMA shall be accepted from the storage facility when the HMA in storage is below the top of the cone of the storage facility, except as the storage facility is being emptied at the end of the working shift.

5-04.3(8)A Acceptance Sampling and Testing—HMA Mixture

1. **General.** Acceptance of HMA shall be as provided under statistical, nonstatistical or commercial evaluation.

   Acceptance of HMA by statistical evaluation is administered under the provisions of Section 5-04.5(1) Quality Assurance Price Adjustments. Statistical evaluation will be used for a class of HMA when the Proposal quantities for that class of HMA exceed 2,500-tons.

   Nonstatistical evaluation will be used for the acceptance of HMA when the Proposal quantities for a class of HMA are 2,500-tons or less.

   Commercial evaluation will be used for Commercial HMA and for other classes of HMA in the following applications: sidewalks, road approaches, ditches, slopes, paths, trails, gores, prelevel, and pavement repair. Other nonstructural applications of HMA accepted by commercial evaluation shall be as approved by the Project Engineer. Sampling and testing of HMA accepted by commercial evaluation will be at the option of the Project Engineer. The Proposal quantity of HMA that is accepted by commercial evaluation will be excluded from the quantities used in the determination of statistical and nonstatistical evaluation.

2. **Aggregates.** For HMA under statistical evaluation the gradation of aggregates will be included in the statistical calculations. The acceptance criteria for aggregate properties of sand equivalent, uncompacted void content and fracture will be their conformance to the requirements of Section 9-03.8(2). These properties will not be included in the statistical evaluation.

3. **Sampling.** Samples for acceptance testing shall be obtained by the Contractor when ordered by the Engineer. The Contractor shall sample the HMA mixture in the presence of the Engineer and in accordance with WSDOT FOP for WAQTC/AASHTO T 168.

4. **Definition of Sampling Lot and Sublot.** For the purpose of acceptance sampling and testing, a lot is defined as the total quantity of material or Work produced for each job mix formula (JMF) placed. A lot is represented by randomly selected samples that will be tested for acceptance. All of the test results obtained from the acceptance samples from a given lot shall be evaluated collectively. Only one lot per mix design will be expected to occur. The initial JMF is defined in Section 5-04.3(7)A Mix Design. The Contractor may request a change in the JMF in accordance with Section 9-03.8(7). If the request is approved, all of the material produced up to the time of the change will be evaluated on the basis of tests on samples taken from that material and a new lot will begin.

   Sampling and testing for statistical evaluation shall be performed on a random basis. The sublot size shall be determined to provide not less than three uniform-sized sublots with a maximum sublot size of 800-tons. Should a lot contain fewer than three sublots, the HMA will be accepted in accordance with nonstatistical evaluation.

   Sampling and testing for nonstatistical evaluation shall be performed on the frequency of one sample per sublot. The sublots shall be approximately uniform in size with a maximum sublot size of 800-tons.

   The quantity of material represented by the final sublot for either statistical or nonstatistical evaluation may be increased to a maximum of 2-times the sublot quantity calculated.

5. **Test Results.** The Engineer will furnish the Contractor with a copy of the results of all acceptance testing performed in the field at the beginning of the next paving shift. The Engineer will also provide the Composite Pay Factor (CPF) of the completed sublots after three sublots have been produced. The CPF will be provided by the midpoint of the next paving shift after sampling.

   Sublot sample test results (gradation and asphalt binder content) may be challenged by the Contractor. For HMA mixture accepted by statistical evaluation with a mix design that did not meet the verification tolerances, the test results in the test section including the percent air voids (Va) may be challenged. To challenge test results, the Contractor shall submit a written challenge within 7-calendar days after receipt of the specific test results. A split of the original acceptance sample will be sent for testing to either the Region Materials Laboratory or the State Materials Laboratory as determined by the Project Engineer. The split of the sample with challenged results will not be tested with the same equipment or by the same tester that ran the original acceptance test. The challenge sample will be tested for a complete gradation analysis and for asphalt binder content.

   The results of the challenge sample will be compared to the original results of the acceptance sample test and evaluated according to the following criteria:

Deviation	
U.S. No. 4 sieve and larger	Percent passing ±4.0
U.S. No. 8 sieve	Percent passing ±2.0
U.S. No. 200 sieve	Percent passing ±0.4
Asphalt binder	Percent binder content ±0.3
Va Percent	Va ±0.7

If the results of the challenge sample testing are within the allowable deviation established above for each parameter, the acceptance sample test results will be used for acceptance of the HMA. The cost of testing will be deducted from any monies due or that may come due the Contractor under the Contract at the rate of $250 per challenge sample. If the results of the challenge sample testing are outside of any one parameter established above, the challenge sample will be used for acceptance of the HMA and the cost of testing will be the Contracting Agency's responsibility.

6. **Test Methods.** Testing of HMA for compliance of volumetric properties (VMA, VFA and Va) will be by WSDOT Standard Operating Procedure SOP 731. Testing for compliance of asphalt binder content will be by WSDOT FOP for AASHTO T 308. Testing for compliance of gradation will be by WAQTC FOP for AASHTO T 27/T 11.

7. **Test Section - HMA Mixture.** A mixture test section shall be constructed for every mix design accepted by Statistical Evaluation. The test section shall be used to determine if the mix meets the requirements of Sections 9-03.8(2) and 9-03.8(6). The HMA mixture test section may be constructed simultaneously with the compaction test section (Section 5-04.3(10)B).

   The test section shall be constructed at the beginning of paving and will be at least 600-tons and a maximum of 800-tons or as approved by the Engineer. No further wearing or leveling HMA will be paved the day of or the day following the construction of the test section. The mixture in the test section will be evaluated as a lot with a minimum of 3 sublots required. If more than 1 test section is required, each test section shall be a separate lot.

   For a test section to be acceptable, with or without a verified mix design, the pay factor (PF) for each of gradation, asphalt binder, VMA and Va shall be 0.95 or greater, and the remaining test requirements in Section 9-03.8(2) (dust/asphalt ratio, sand equivalent, uncompacted void content and fracture) shall conform to the requirements of that section. When the pay factor for any item is less than 0.95 the Contractor shall make adjustments to the mix in accordance with Section 9-03.8(7) and construct another test section. The Project Engineer may waive the requirement for the construction of another test section.

   For all HMA of the same class and PG asphalt binder grade payment for the HMA in the test section(s) will be in accordance with the provisions of 5-04.5(1) Quality Assurance Price Adjustments. The CPF for the HMA represented by the first test section shall be a minimum of 0.75 if the mix design was verified by the Contracting agency. The calculation of the CPF in a test section with a verified mix design will include gradation and asphalt binder content. The calculation of the CPF in a test section with a mix design that did not verify will include gradation, asphalt binder content and percent air voids (Va).

5-04.3(9) Spreading and Finishing

The mixture shall be laid upon an approved surface, spread, and struck off to the grade and elevation established. HMA pavers complying with Section 5-04.3(3) shall be used to distribute the mixture. Unless otherwise directed by the Engineer, the nominal compacted depth of any layer of any course shall not exceed the following:

HMA Class 1"	0.35-feet
HMA Class ¾" and HMA Class ½"	0.30-feet
HMA Class ⅜"	0.10-feet

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the paving may be done with other equipment or by hand.

When more than 1 JMF is being utilized to produce HMA, the material produced for each JMF shall be placed by separate spreading and compacting equipment. The intermingling of HMA produced from more than 1 JMF is prohibited. Each strip of HMA placed during a work shift shall conform to a single JMF established for the class of HMA specified unless there is a need to make an adjustment in the JMF.

5-04.3(10) Compaction

5-04.3(10)A General

Immediately after the HMA has been spread and struck off, and after surface irregularities have been adjusted, the mix shall be thoroughly and uniformly compacted. The completed course shall be free from ridges, ruts, humps, depressions, objectionable marks, and irregularities and shall conform to the line, grade, and cross-section shown in the Plans. If necessary, the JMF may be altered in accordance with Section 9-03.8(7) to achieve desired results.

Compaction shall take place when the mixture is in the proper condition so that no undue displacement, cracking, or shoving occurs. Areas inaccessible to large compaction equipment shall be compacted by mechanical or hand tampers. Any HMA that becomes loose, broken, contaminated, shows an excess or deficiency of asphalt, or is in any way defective, shall be removed and replaced with new hot mix that shall be immediately compacted to conform to the surrounding area.

The type of rollers to be used and their relative position in the compaction sequence shall generally be the Contractor's option, provided that the specified densities are attained. An exception shall be that pneumatic tired rollers shall be used between October 1st of any year and April 1st of the following year. Coverages with a vibratory or steel wheel roller may precede pneumatic tired rolling. Unless the Project Engineer has approved otherwise, vibratory rollers shall not be operated in the vibratory mode when the internal temperature of the mix is less than 175°F. Regardless of mix temperature, a vibratory roller shall not be operated in a vibratory mode when checking or cracking of the mat occurs. Vibratory rollers in the vibratory mode are prohibited on bridge decks.

5-04.3(10)B Control

1. **General.** HMA used in traffic lanes, including lanes for ramps, truck climbing, weaving, and speed change, and having a specified compacted course thickness greater than 0.10-foot, shall be compacted to a specified level of relative density. The specified level of relative density shall be a Composite Pay Factor (CPF) of not less than 0.75 when evaluated in accordance with Section 1-06.2, using a minimum of 91.0-percent of the reference maximum density as determined by WSDOT FOP for AASHTO T 209. The specified level of density attained will be determined by the statistical evaluation of tests taken in accordance with FOP for WAQTC TM 8 and WSDOT SOP T 729 on the day the mix is placed (after completion of the finish rolling). Each lot will be divided into 5-sublots. The sublot locations within each density lot will be determined by the stratified random sampling procedure conforming to WSDOT Test Method No. 716. The quantity represented by each density lot will be no greater than a single day's production or 400-tons, whichever is less, except the final lot each day may be increased to a maximum of 600-tons.

   a. **Cyclic Density**. The Engineer may also evaluate the HMA for low cyclic density of the pavement in accordance with WSDOT SOP 733. Low cyclic density areas are defined as spots or streaks in the pavement that are less than 89.0-percent of the reference maximum density. If 4 or more low cyclic density areas are identified in a lot, a cyclic density price adjustment will be assessed for that lot. The price adjustment will be calculated as 15 percent of the unit Bid price for the quantity of HMA represented by that lot. Only 1 area per delivered truck and 1 area per delivered trailer of HMA will be counted toward the number of low cyclic density areas. Any area tested for density under Section 5-04.3(10)B Control 1. General, will be included in this analysis.

   b. **Longitudinal Joint Density.** The Engineer will evaluate the HMA wearing surface for low density at the longitudinal joint in accordance with WSDOT SOP 735. Low density is defined as less than 90.0-percent of the reference maximum density. If 1 density reading, at either longitudinal joint, is below 90.0-percent of the reference maximum density, a $200 per lot price adjustment will be assessed for that lot.

2. **Test Section - Compaction.** For HMA requiring a specified level of relative density a compaction test section may be constructed for each mix design. Prior to the start of paving the Contractor shall notify the PE that a test section is requested and will be constructed.

   The test section, if requested, shall be constructed at the beginning of paving, and shall be done using the equipment and rolling patterns that the Contractor expects to use in the paving operation. The test section will be a maximum of 800-tons. Only 1 test section will be allowed per mix design. When a compaction test section and HMA mixture test section (Section 5-04.3(8)A) are both required they may be constructed simultaneously. All of the HMA in the test section shall be evaluated in accordance with 5-04.3(10)B. The CPF for compaction for the HMA in a density lot that includes a test section shall be a minimum of 0.75. If a test section is not completed, the HMA will be accepted by statistical evaluation. The Contractor may continue paving operations upon completion of the 800-tons in the test section. HMA placed in excess of 800-

tons will be accepted by statistical evaluation. This will require consideration of the presence of the correlation factor for the nuclear density gauge and may require resolution after the correlation factor is known.

3. **Test Results.** The Project Engineer will furnish the Contractor with a copy of the results of all compaction acceptance testing within one working day. Acceptance of HMA compaction will be based on the statistical evaluation and CPF so determined.

   For compaction lots falling below a 1.00 pay factor and thus subject to price reduction or rejection, the Contractor may request that cores be used for acceptance of HMA compaction. When cores are taken by the Contracting Agency at the request of the Contractor, they shall be requested by noon of the next workday after receiving the test results. The cores will be taken at approximately the same locations as the nuclear density gauge tests in the compaction lot being challenged. When the CPF for the lot based on the results of the HMA cores is less than 1.00, the cost for the coring will be deducted from any monies due or that may become due the Contractor under the Contract at the rate of $125 per core.

HMA constructed under conditions other than those listed above in paragraph "1. General" shall be compacted on the basis of a test point evaluation of the compaction train. The test point evaluation shall be performed in accordance with instructions from the Project Engineer. The number of passes with an approved compaction train, required to attain the maximum test point density, shall be used on all subsequent paving.

HMA for preleveling shall be thoroughly compacted. HMA that is used for preleveling wheel rutting shall be compacted with a pneumatic tire roller unless otherwise approved by the Engineer.

5-04.3(11) Reject HMA

1. **Rejection by Contractor.** The Contractor may, prior to sampling, elect to remove any defective material and replace it with new material. Any such new material will be sampled, tested, and evaluated for acceptance.
2. **Rejection Without Testing.** The Project Engineer may, without sampling, reject any batch, load, or section of Roadway that appears defective in gradation or asphalt binder content. Material rejected before placement shall not be incorporated into the pavement. Any rejected section of Roadway shall be removed.

   No payment will be made for the rejected materials or the removal of the materials unless the Contractor requests that the rejected material be tested. If the Contractor elects to have the rejected material tested, a minimum of 3 representative samples will be obtained and tested. Acceptance of rejected material will be based on conformance with the statistical acceptance Specification. If the CPF for the rejected material is less than 0.75, no payment will be made for the rejected material, and in addition, the cost of sampling and testing shall be borne by the Contractor. However, if the CPF is greater than or equal to 0.75, the cost of sampling and testing will be borne by the Contracting Agency and the mix will be compensated at a CPF of 0.75. If rejection occurs after placement and the CPF is greater than 0.75, compensation for the rejected mix will be at the calculated CPF with an addition of 25-percent of the unit Contract price added for the cost of removal and disposal.

3. **A Partial Sublot.** In addition to the random acceptance sampling and testing, the Project Engineer may also isolate from a normal sublot any material that is suspected of being defective in relative density, gradation or asphalt binder content. Such isolated material will not include an original sample location. A minimum of 3 random samples of the suspect material will be obtained and tested. The material will then be statistically evaluated as an independent lot in accordance with Section 1-06.2(2).
4. **An Entire Sublot.** An entire sublot that is suspected of being defective may be rejected. When a sublot is rejected a minimum of 2 additional random samples from this sublot will be obtained. These additional samples and the original sublot will be evaluated as an independent lot in accordance with Section 1-06.2(2).
5. **A Lot in Progress.** The Contractor shall shut down operations and shall not resume HMA placement until such time as the Project Engineer is satisfied that material conforming to the Specifications can be produced:
   a. When the Composite Pay Factor (CPF) of a lot in progress drops below 1.00 and the Contractor is taking no corrective action, or
   b. When the Pay Factor (PF) for any constituent of a lot in progress drops below 0.95 and the Contractor is taking no corrective action, or
   c. When either the PF_i for any constituent or the CPF of a lot in progress is less than 0.75.
6. **An Entire Lot.** An entire lot with a CPF of less than 0.75 will be rejected. The designated percentage reduction as defined in Section 1-06.2(2)B under Financial Incentive Paragraph 1, Item 3, shall be 25-percent.

5-04.3(12) Joints

5-04.3(12)A Transverse Joints

The Contractor shall conduct operations such that the placing of the top or wearing course is a continuous operation or as close to continuous as possible. Unscheduled transverse joints will be allowed and the roller may pass over the unprotected end of the freshly laid mixture only when the placement of the course must be discontinued for such a length of time that the mixture will cool below compaction temperature. When the Work is resumed, the previously compacted mixture shall be cut back to produce a slightly beveled edge for the full thickness of the course.

A temporary wedge of HMA constructed on a 50H:1V shall be constructed where a transverse joint is open to traffic. The HMA in the temporary wedge shall be separated from the permanent HMA by strips of heavy wrapping paper. The wrapping paper shall be removed and the joint trimmed to a slightly beveled edge for the full thickness of the course prior to resumption of paving.

The material that is cut away shall be wasted and new mix shall be laid against the cut. Rollers or tamping irons shall be used to seal the joint.

5-04.3(12)B Longitudinal Joints

The longitudinal joint in any 1 course shall be offset from the course immediately below by not more than 6-inches nor less than 2-inches. All longitudinal joints constructed in the wearing course shall be located at a lane line or an edge line of the Traveled Way. Except, on one-lane ramps a longitudinal joint may be constructed at the center of the traffic lane, subject to approval by the Project Engineer, if:

1. The ramp must remain open to traffic, or
2. The ramp is closed to traffic and a hot-lap joint is constructed.

If a hot-lap joint is allowed, 2 paving machines shall be used; a minimum compacted density in accordance with Section 5-04.3(10)B shall be achieved throughout the traffic lane; and construction equipment other than rollers shall not operate on any uncompacted mix.

When HMA is placed adjacent to cement concrete pavement, the Contractor shall construct longitudinal joints between the HMA and the cement concrete pavement. The joint shall be sawed to the dimensions shown on Standard Plan A-1 and filled with joint sealant meeting the requirements of Section 9-04.2.

5-04.3(13) Surface Smoothness

The completed surface of all courses shall be of uniform texture, smooth, uniform as to crown and grade, and free from defects of all kinds. The completed surface of the wearing course shall not vary more than ⅛-inch from the lower edge of a 10-foot straightedge placed on the surface parallel to the centerline. The transverse slope of the completed surface of the wearing course shall vary not more than ¼-inch in 10-feet from the rate of transverse slope shown in the Plans.

When deviations in excess of the above tolerances are found that result from a high place in the HMA, the pavement surface shall be corrected by one of the following methods:

1. Removal of material from high places by grinding with an approved grinding machine, or
2. Removal and replacement of the wearing course of HMA, or
3. By other method approved by the Project Engineer.

Correction of defects shall be carried out until there are no deviations anywhere greater than the allowable tolerances.

Deviations in excess of the above tolerances that result from a low place in the HMA and deviations resulting from a high place where corrective action, in the opinion of the Project Engineer, will not produce satisfactory results will be accepted with a price adjustment. The Project Engineer shall deduct from monies due or that may become due to the Contractor the sum of $500.00 for each and every section of single traffic lane 100-feet in length in which any excessive deviations described above are found.

When Portland cement concrete pavement is to be placed on HMA, the surface tolerance of the HMA shall be such that no surface elevation lies above the Plan grade minus the specified Plan depth of Portland cement concrete pavement. Prior to placing the Portland cement concrete pavement, any such irregularities shall be brought to the required tolerance by grinding or other means approved by the Project Engineer.

When utility appurtenances such as manhole covers and valve boxes are located in the Traveled Way, the Roadway shall be paved before the utility appurtenances are adjusted to the finished grade.

5-04.3(14) Planing Bituminous Pavement

Planing shall be performed in such a manner that the underlying pavement is not torn, broken, or otherwise damaged by the planing operation. Delamination or raveling of the underlying pavement will not be construed as damage due to the Contractor's operations. Pavement outside the limits shown in the Plans or designated by the Engineer that is damaged by the Contractor's operations shall be repaired to the satisfaction of the Engineer, at the Contractor's expense.

For mainline planing operations, the equipment shall have automatic controls, with sensors for either or both sides of the equipment. The controls shall be capable of sensing the grade from an outside reference line, or a mat-referencing device. The automatic controls shall have a transverse slope controller capable of maintaining the mandrel at the desired transverse slope (expressed as a percentage) within plus or minus 0.1-percent.

The planings and other debris resulting from the planing operation shall become the property of the Contractor and be disposed of in accordance with Section 2-03.3(7)C. The planings may be utilized as RAP, within the requirements of Section 5-04.2 or 9-03.21.

5-04.3(15) HMA Road Approaches

HMA approaches shall be constructed at the locations shown in the Plans or where staked by the Project Engineer. The Work shall be performed in accordance with Section 5-04.

5-04.3(16) Weather Limitations

HMA for wearing course shall not be placed on any Traveled Way between October 1 of any year and April 1 of the following year without written approval from the Project Engineer.

Asphalt for prime coat shall not be applied when the ground temperature is lower than 50°F without written approval of the Project Engineer.

HMA shall not be placed on any wet surface, or when the average surface temperatures are less than those specified in the following table, or when weather conditions otherwise prevent the proper handling or finishing of the bituminous mixtures:

	Surface Temperature Limitation	
Compacted Thickness (Feet)	Wearing Course	Other Courses
Less than 0.10	55°F	45°F
0.10 to 0.20	45°F	35°F
0.21 to 0.35	35°F	35°F
More than 0.35	(Not Applicable)	25ºF*

*Only on dry Subgrade, not frozen and when air temperature is rising.

5-04.3(17) Paving Under Traffic

When the Roadway being paved is open to traffic, the requirements of this section shall apply.

The Contractor shall keep on-ramps and off-ramps open to traffic at all times except when paving the ramp or paving across the ramp. During such time, and provided that there has been an advance warning to the public, the ramp may be closed for the minimum time required to place and compact the mixture. In hot weather, the Project Engineer may require the application of water to the pavement to accelerate the finish rolling of the pavement and to shorten the time required before reopening to traffic.

Before closing a ramp, advance warning signs shall be placed and signs shall also be placed marking the detour or alternate route. Ramps shall not be closed on consecutive interchanges at the same time.

During paving operations, temporary pavement markings shall be maintained throughout the project. Temporary pavement markings shall be installed on the Roadway prior to opening to traffic. Temporary pavement markings shall be in accordance with Section 8-23.

All costs in connection with performing the Work in accordance with these requirements, except the cost of temporary pavement markings, shall be included in the unit Contract prices for the various Bid items involved in the Contract.

5-04.3(18) Vacant

5-04.3(19) Sealing of Pavement Surfaces

Where shown in the Plans, the Contractor shall apply a fog seal. Before application of the fog seal all surfaces shall be thoroughly cleaned of dust, soil, pavement grindings, and other foreign matter. The fog seal shall be CSS-1 or CSS-1h emulsified asphalt uniformly applied to the pavement. The finished application shall be free of streaks and bare spots. The emulsified asphalt shall be diluted at a rate of 1-part water to 1-part emulsified asphalt unless otherwise directed by the Project Engineer. The diluted emulsified asphalt shall be applied at the rate of 0.10 to 0.18 (0.03 to 0.05 residual) gallons per square yard. The emulsified asphalt shall be applied within the temperature range specified for these asphalt emulsions in Section 5-02.3(3). Unless otherwise approved by the Project Engineer, the fog seal shall be applied prior to opening to traffic.

5-04.3(20) Anti-Stripping Additive

When directed by the Project Engineer, an anti-stripping additive shall be added to the HMA in accordance with Section 9-02.4.

5-04.3(21) Asphalt Binder Revision

When the Contracting Agency provides a source of aggregate, the expected percentage content of new asphalt binder in the resulting mix will be identified in the Contract documents.

Should the actual percentage of new asphalt binder required by the job mix formula for asphalt concrete produced with Agency-provided aggregate vary by more than plus or minus 0.3-percent from the amount shown in the Contract documents, an adjustment in payment will be made. The adjustment in payment (plus or minus) will be based on the invoice cost to the Contractor. No adjustment will be made when the Contractor elects not to use a Contracting Agency-provided source, or when no source is made available by the Contracting Agency.

5-04.4 Measurement

HMA Cl. ___ PG ___, HMA for ___ Cl. ___ PG ___, and Commercial HMA will be measured by the ton in accordance with Section 1-09.2, with no deduction being made for the weight of asphalt binder, blending sand, mineral filler, or any other component of the mixture. If the Contractor elects to remove and replace mix as allowed by Section 5-04.3(11), the material removed will not be measured.

Preparation of Untreated Roadway will be measured by the mile once along the centerline of the main line Roadway. No additional measurement will be made for ramps, Auxiliary Lanes, service roads, Frontage Roads, or Shoulders. Measurement will be to the nearest 0.01-mile.

No specific unit of measure will apply to the force account item of Crack Sealing.

Soil Residual Herbicide will be measured by the mile for the stated width to the nearest 0.01-mile or by the square yard, whichever is designated in the Proposal.

Pavement Repair Excavation will be measured by the square yard of surface marked prior to excavation.

Asphalt for Prime Coat will be measured by the ton in accordance with Section 1-09.2.

Prime Coat Aggregate will be measured by the cubic yard, truck measure, or by the ton, whichever is designated in the Proposal.

Asphalt For Fog Seal will be measured by the ton, before dilution, in accordance with Section 1-09.2.

Longitudinal Joint Seals between the HMA and cement concrete pavement will be measured by the linear foot along the line and slope of the completed joint seal.

Planing Bituminous Pavement will be measured by the square yard.

Temporary Pavement Marking will be measured by the linear foot as provided in Section 8-23.4.

Removing Temporary Pavement Marking will be measured by the linear foot as provided in Section 8-23.4.

Water will be measured by the M gallon as provided in Section 2-07.4.

No specific unit of measure will apply to the calculated item of Anti-Stripping Additive.

No specific unit of measure will apply to the calculated item of Job Mix Compliance Price Adjustment.

No specific unit of measure will apply to the calculated item of Compaction Price Adjustment.

No specific unit of measure will apply to the calculated item of Cyclic Density Price Adjustment.

No specific unit of measure will apply to the calculated item of Asphalt Binder Revision.

No specific unit of measure will apply to the calculated item of Longitudinal Joint Density Price Adjustment.

5-04.5 Payment

Payment will be made in accordance with Section 1-04.1, for each of the following Bid items that are included in the Proposal:

"HMA Cl. ___ PG ___", per ton.

"HMA for Approach Cl. ___ PG ___", per ton.

"HMA for Preleveling Cl. ___ PG ___", per ton.

"HMA for Pavement Repair Cl. ___ PG ___", per ton.

"Commercial HMA", per ton.

The unit Contract price per ton for "HMA Cl. ___ PG ___", "HMA for Approach Cl. ___ PG ___", "HMA for Preleveling Cl. ___ PG ___", "HMA for Pavement Repair Cl. ___ PG ___", and "Commercial HMA" shall be full compensation for all costs incurred to carry out the requirements of Section 5-04 except for those costs included in other items which are included in this sub-section and which are included in the Proposal.

"Preparation of Untreated Roadway", per mile.

The unit Contract price per mile for "Preparation of Untreated Roadway" shall be full pay for all Work described under Section 5-04.3(5)B, with the exception, however, that all costs involved in patching the Roadway prior to placement of HMA shall be included in the unit Contract price per ton for "HMA Cl. ___ PG ___" which was used for patching. If the Proposal does not include a Bid item for "Preparation of Untreated Roadway", the Roadway shall be prepared as specified, but the Work shall be included in the Contract prices of the other items of Work.

"Crack Sealing", by force account.

"Crack Sealing" will be paid for by force account as specified in Section 1-09.6. For the purpose of providing a common Proposal for all Bidders, the Contracting Agency has entered an amount in the Proposal to become a part of the total Bid by the Contractor.

"Soil Residual Herbicide ____ ft. Wide," per mile, or

"Soil Residual Herbicide", per square yard.

The unit Contract price per mile or per square yard for "Soil Residual Herbicide" shall be full payment for all costs incurred to obtain, provide and install herbicide in accordance with Section 5-04.3(5)D.

"Pavement Repair Excavation Incl. Haul", per square yard.

The unit Contract price per square yard for "Pavement Repair Excavation Incl. Haul" shall be full payment for all costs incurred to perform the Work described in Section 5-04.3(5)E with the exception, however, that all costs involved in the placement of HMA shall be included in the unit Contract price per ton for "HMA for Pavement Repair Cl. ___ PG ___", per ton.

"Asphalt for Prime Coat", per ton.

The unit Contract price per ton for "Asphalt for Prime Coat" shall be full payment for all costs incurred to obtain, provide and install the material in accordance with Section 5-04.3(5)B.

"Prime Coat Agg.", per cubic yard, or per ton.

The unit Contract price per cubic yard or per ton for "Prime Coat Agg." shall be full pay for furnishing, loading, and hauling aggregate to the place of deposit and spreading the aggregate in the quantities required by the Engineer.

"Asphalt for Fog Seal", per ton.

The unit Contract price per ton for "Asphalt for Fog Seal" shall be full pay for all costs of material, labor, tools, and equipment necessary for the application of the fog seal as specified. If there is no Bid item and a fog seal is required, it shall be applied and the Work shall be included in the unit Contract prices of the other Work items.

"Longitudinal Joint Seal", per linear foot.

The unit Contract price per linear foot for "Longitudinal Joint Seal" shall be full payment for all costs incurred to perform the Work described in Section 5-04.3(12).

"Planing Bituminous Pavement", per square yard.

The unit Contract price per square yard for "Planing Bituminous Pavement" shall be full payment for all costs incurred to perform the Work described in Section 5-04.3(14).

"Temporary Pavement Marking", per linear foot.

Payment for "Temporary Pavement Marking" is described in Section 8-23.5.

"Removing Temporary Pavement Marking", per linear foot.

Payment for "Removing Temporary Pavement Marking" is described in Section 8-23.5.

"Water", per M gallon.

Payment for "Water" is described in Section 2-07.5.

"Anti-Stripping Additive", by calculation.

"Anti-Stripping Additive" will be paid for in accordance with Section 1-09.6 except that no overhead, profit or other costs shall be allowed. Payment shall be made only for the invoice cost of the additive. The quantity of asphalt binder shall not be reduced by the quantity of anti-stripping additive used. For the purpose of providing a common Proposal for all Bidders, the Contracting Agency has entered an amount in the Proposal to become a part of the total Bid by the Contractor.

"Job Mix Compliance Price Adjustment," by calculation.

"Job Mix Compliance Price Adjustment" will be calculated and paid for as described in Section 5-04.5(1).

"Compaction Price Adjustment," by calculation.

"Compaction Price Adjustment" will be calculated and paid for as described in Section 5-04.5(1).

"Cyclic Density Price Adjustment," by calculation.

"Cyclic Density Price Adjustment" will be calculated and paid for as described in Section 5-04.3(10)B item 1A.

"Asphalt Binder Revision" by calculation.

"Asphalt Binder Revision" will be calculated and paid for as described in Section 5-04.3(21).

"Longitudinal Joint Density Price Adjustment" by calculation.

"Longitudinal Joint Density Price Adjustment" will be calculated and paid for as described in Section 5-04.3(10)B item 1B.

5-04.5(1) Quality Assurance Price Adjustments

All HMA will be subject to price adjustments. Price adjustments for HMA mixture will be based on the requirements of 5-04.3(8). Price adjustments for HMA compaction will be based on the requirements in 5-04.3(10). For the purpose of providing a common Proposal for all Bidders, the Contracting Agency has estimated a calculated amount for all price adjustment items and has entered these amounts in the Proposal to become a part of the total Bid by the Contractor. Statistical analysis of the HMA will be performed in accordance with Section 1-06.2.

5-04.5(1)A Price Adjustments for Quality of HMA Mixture

Statistical analysis of quality of gradation and asphalt content will use the following price adjustment factors:

Table of Price Adjustment Factors

Constituent	Factor "f"
All aggregate passing: 1½", 1", ¾", ½", ⅜" and U.S. No.4 sieves	2
All aggregate passing U.S. No. 8 sieve	15
All aggregate passing U.S. No. 200 sieve	20
Asphalt binder	52
Va	30

A pay factor will be calculated for each sieve listed that is equal to or smaller than the maximum allowable aggregate size (100-percent passing sieve) and for the asphalt binder. The "f" factor provided for Va will only be used for the calculation of the pay factor for test section(s) when the mix design was not verified in Section 5-04.3(7)A.

1. **Statistical Evaluation.** For each lot of HMA produced under Statistical Evaluation, a Job Mix Compliance Incentive Factor (JMCIF) will be determined. The JMCIF equals the algebraic difference of CPF minus 1.00 multiplied by 60-percent. The Job Mix Compliance Price Adjustment will be calculated as the product of the JMCIF, the quantity of HMA in the lot in tons, and the unit Contract price per ton of mix.
2. **Nonstatistical Evaluation.** Each lot of HMA produced under Nonstatistical Evaluation and having all constituents falling within the tolerance limits of the job mix formula shall be accepted at the unit Contract price with no further evaluation. When one or more constituents fall outside the nonstatistical tolerance limits in Section 9-03.8(7), the lot shall be evaluated in accordance with Section 1-06.2 to determine the appropriate CPF. The nonstatistical tolerance limits will be used in the calculation of the CPF and the maximum CPF shall be 1.00. When less than three sublots exist, backup samples of the existing sublots or samples from the Roadway shall be tested to provide a minimum of three sets of results for evaluation.
3. **Commercial Evaluation.** If sampled and tested, HMA produced under Commercial Evaluation and having all constituents falling within the tolerance limits of the job mix formula shall be accepted at the unit Contract price with no further evaluation. When one or more constituents fall outside the commercial tolerance limits in Section 9-03.8(7), the lot shall be evaluated in accordance with Section 1-06.2 to determine the appropriate CPF. The commercial tolerance limits will be used in the calculation of the CPF and the maximum CPF shall be 1.00. When less than three sublots exist, backup samples of the existing sublots or samples from the street shall be tested to provide a minimum of three sets of results for evaluation.

For each lot of HMA produced under Nonstatistical or Commercial Evaluation when the calculated CPF is less than 1.00, a Nonconforming Mix Factor (NCMF) will be determined. The NCMF equals the algebraic difference of CPF minus 1.00 multiplied by 60-percent. The Job Mix Compliance Price Adjustment will be calculated as the product of the NCMF, the quantity of HMA in the lot in tons, and the unit Contract price per ton of mix.

If a constituent is not measured in accordance with these Specifications, its individual pay factor will be considered 1.00 in calculating the Composite Pay Factor (CPF).

5-04.5(1)B Price Adjustments for Quality of HMA Compaction

For each compaction control lot, a Compaction Incentive Price Adjustment Factor (CIPAF) will be determined. The CIPAF equals the algebraic difference of the CPF minus 1.00 multiplied by 40-percent. The Compaction Price Adjustment will be calculated as the product of CIPAF, the quantity of HMA in the compaction control lot in tons, and the unit Contract price per ton of mix.